ADAM MICKIEWICZ UNIVERSITY IN POZNAŃ
Faculty of English

Does cross-linguistic similarity play a role in reading? A self-paced reading study with Polish-English-Norwegian multilinguals

Anna Skałba, Sylwiusz Żychliński,
Magdalena Wrembel

Presentation outline

1. General description
2. Previous studies
3. Constructions under investigation
4. Research questions and hypotheses
5. Methods
6. Results
7. Discussion

1. General description
2. Previous studies
3. Constructions under investigation
4. Research questions and hypotheses
5. Methods
6. Results
7. Discussion

Study description

- part of a larger project investigating cross-linguistic influence (CLI) in phonetics/phonology and syntax in Polish (L1), English (L2) and Norwegian (L3)
- exploratory study meant to contribute to the field of multilingual studies (especially given the scarcity of online processing studies in L3)
- tested constructions – different grammar domains:
  - lexical-syntactic: prepositions, reflexive verbs
  - morpho-syntactic: articles, gender agreement
- methodology – self-paced reading task with post-stimulus grammaticality judgement questions

Aim

- to test the influence of **cross-linguistic similarities and differences** (L1=L2=L3 vs. L1=L3≠L2 / L2=L3≠L1) on **sentence comprehension in L3** with L1 Polish – L2 English – L3 Norwegian multilinguals

1. General description
2. **Previous studies**
3. Constructions under investigation
4. Research questions and hypotheses
5. Methods
6. Results
7. Discussion

Previous studies – prepositions and reflexives

Gibson et al. (2001)

- open cloze task on the acquisition of prepositions in L3 German
- lack of facilitation based on structural similarity between L1 and L3

Alexieva (2012)

- written production study on the acquisition of reflexive verbs in L2 Russian
- difficulties in acquiring reflexive verbs for L1 English speakers, even at higher proficiencies

Previous studies – articles

Ionin et al. (2021)

- SPR and AJT study with Mandarin-English bilinguals
- effects of grammaticality in online processing

Choo (2022)

- SPR and AJT study with Korean-English bilinguals
- effects of grammaticality in online processing

Jensen et al. (2023)

- AJT study with Russian-English-Norwegian trilinguals and Norwegian-English and Russian-English bilinguals
- facilitative effect of L2 English on L3 Norwegian for definiteness

Previous studies – gender agreement

Alemán Bañón et al. (2018)

- ERP study on gender agreement violations in L2 Spanish
- grammaticality effects modulated by proficiency
- similarity between L1 and L2 as only one of the factors impacting acquisition

Di Pisa et al. (2022)

- SPR and AJT study on the effects of morphological markedness on gender agreement between heritage and homeland speakers of Italian
- longer RTs for ungrammatical sentences in HS, especially for marked (feminine) adjectives

Previous studies – methods

- self-paced reading task fairly common in L2 and L3 acquisition research (e.g., Sokolova & Slabakova, 2019; Długosz, 2023)
- post-stimulus grammaticality judgment task sometimes criticized for ”contaminating” the online part of the experiment (Keating & Jegerski, 2015)
- however: numerous studies with the post-stimulus AJT (e.g., Dussias & Piñar, 2010; Jackson & Dussias, 2009; Jackson & van Hell, 2011)
- alternatively: comprehension questions (e.g., Sokolova & Slabakova, 2019); separation of self-paced reading from the AJT task (e.g. Długosz, 2023)

1. General description
2. Previous studies
3. Constructions under investigation
4. Research questions and hypotheses
5. Methods
6. Results
7. Discussion

Constructions

1. **lexical-syntactic** (present in three languages)
    - prepositional verbs and adjectives
    - reflexive verbs
2. **morpho-syntactic** (present in two languages)
    - gender agreement (neuter noun + adjective)
    - definite and indefinite articles

Prepositional verbs and adjectives

1. **NO = EN = PL (same preposition in all three languages)**

🇳🇴 Direktøren deres betalte for / *om blyanter og papir.
🇬🇧 Their director paid for / *about pencils and paper.
🇵🇱 Ich dyrektor zapłacił za / *o ołówki i papier.

2. **NO = EN ≠ PL (same preposition in NO & EN, different in PL)**

🇳🇴 Disse rommene er nok for / *på konferanser og møter.
🇬🇧 These rooms are enough for / *on conferences and meetings.
🇵🇱 Te pokoje są wystarczające *dla / *na konferencje i spotkania.

Reflexive verbs

1. **NO = PL = EN (reflexive in all three languages)**

🇳🇴 Den unge gutten skadet seg / *Ø kraftig i fingeren.
🇬🇧 The little boy hurt himself / *Ø badly in the finger.
🇵🇱 Mały chłopiec mocno skaleczył się / *Ø w palec.

2. **NO = PL ≠ EN (reflexive in NO & PL, non-reflexive in EN)**

🇳🇴 Søsteren hans føler seg / *Ø ofte dårlig.
🇬🇧 His sister often feels *herself / Ø bad.
🇵🇱 Jego siostra często czuje się / *Ø źle.

Articles

1. **NO = EN (indefinite articles)**

🇳🇴 Denne filmen er en / *Ø tegnefilm om to prinsesser.
🇬🇧 This film is a / *Ø cartoon about two princesses.

2. **NO ≠ EN (definite articles)**

🇳🇴 Denne parken er skogen / *skog hun jogget i.
🇬🇧 This park is the / *Ø forest in which she was jogging.

Gender agreement

1. **NO = PL (neuter in NO & PL)**

🇳🇴 Dette dyret er sultent / *sulten om vinteren.
🇵🇱 To zwierzę jest głodne / *głodny w zimie.

2. **NO ≠ PL (neuter in NO masculine or feminine in PL)**

🇳🇴 Dette kjøleskapet er tomt / *tom hele tiden.
🇵🇱 Ta lodówka jest cały czas *puste / pusta.

1. General description
2. Previous studies
3. Constructions under investigation
4. **Research questions and hypotheses**
5. Methods
6. Results
7. Discussion

Research questions

RQ1: Are Polish-English-Norwegian multilinguals sensitive to **grammatical violations in L3 Norwegian** in online and offline processing?

RQ2: Is their performance influenced by **cross-linguistic similarities and differences** between L3 Norwegian and L1 Polish and/or L2 English?

Hypotheses

H1: shorter RTs for grammatical than ungrammatical sentences

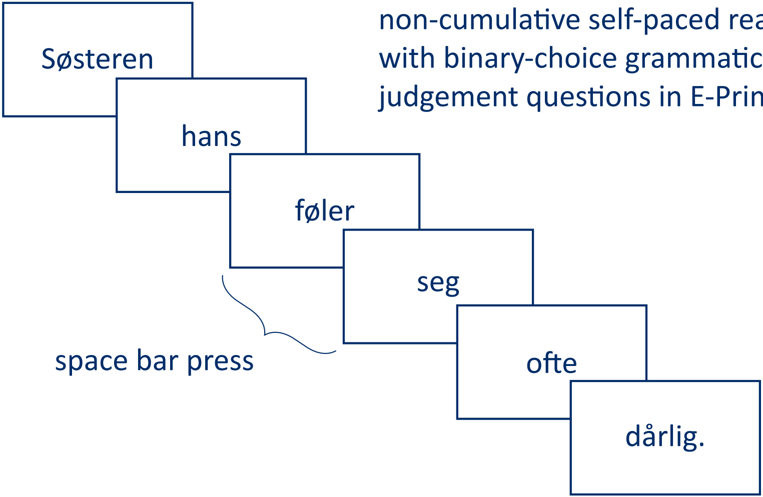
H2: shorter RTs in cross-linguistically similar than different conditions (both for grammatical and ungrammatical sentences):

- prepositional verbs and adjectives:
  NO = EN = PL **<** NO = EN ≠ PL
- reflexive verbs: NO = EN = PL **<** NO = PL ≠ EN
- articles: NO = EN **<** NO ≠ EN
- gender agreement: NO = PL **<** NO ≠ PL

1. General description
2. Previous studies
3. Constructions under investigation
4. Research questions and hypotheses
5. **Methods**
6. Results
7. Discussion

Study design

non-cumulative self-paced reading with binary-choice grammaticality judgement questions in E-Prime 3.0



Søsteren

hans

føler

seg

ofte

dårlig.

space bar press

Participants

1. **experimental group**
   - 34 Polish-English-Norwegian multilinguals (23 in Szczecin, 11 in Poznań)
   - English proficiency – Cambridge General English placement test (M = 19.65/25; SD = 3.00)
   - Norwegian proficiency – UiT placement test (M = 27.85/36; SD = 5.64)
2. **control group**
   - 13 native Norwegian speakers
   - English proficiency – Cambridge General English placement test (M = 22.91/25; SD = 2.30)

Stimuli

- key words: no cognates between Norwegian, English and Polish; frequency 3-6 on Zipf scale (NoWaC corpus)
- key word position: 4th - 2nd word from the end of the sentence
- length of sentences: 6-8 words
- 192 token sentences: 12 sentences
  x 2 similarity conditions (cross-linguistically similar vs. different)
  x 2 grammaticality conditions (grammatical vs. ungrammatical)
  x 4 grammatical constructions

Procedure

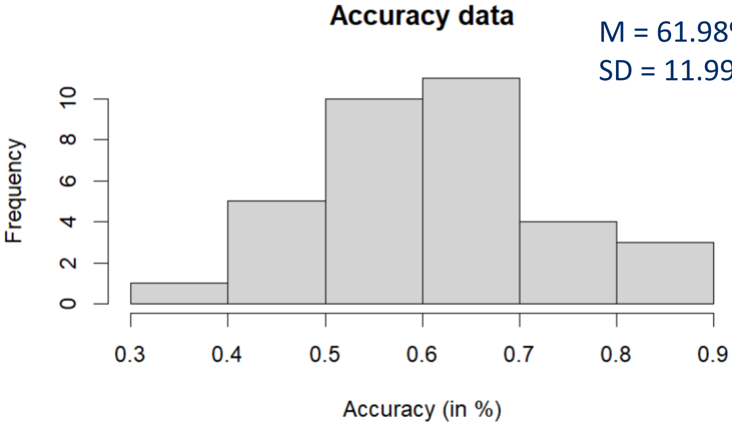
- part of a battery of studies on phonetics, phonology, and syntax
- **experimental group**: Polish universities in Szczecin and Poznań; April-May 2023
- **control group**: UiT The Arctic University of Norway; June 2023 (feasibility constraints)

1. General description
2. Previous studies
3. Constructions under investigation
4. Research questions and hypotheses
5. Methods
6. Results
7. Discussion

Exclusion criteria from analysis

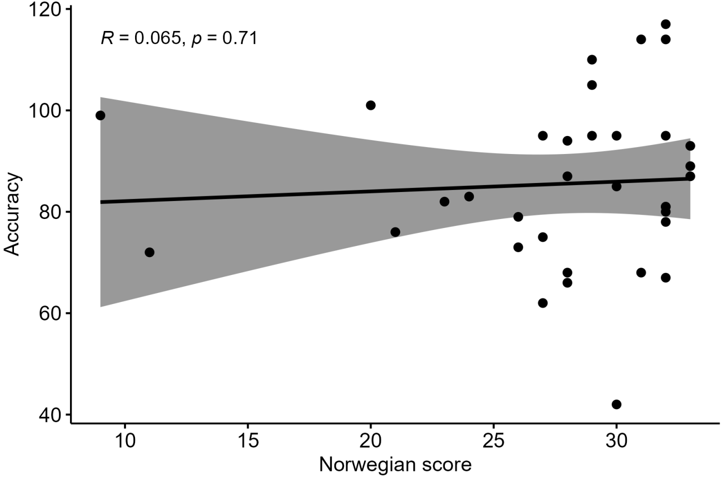
- items with native speakers' acceptance level < 60%-70% – 54/192 sentence pairs (28.13% of all data):
    - prepositional verbs and adjectives – 14/48 (29.17%)
    - reflexive verbs – 15/48 (31.25%)
    - articles – 19/48 (39.58%)
    - gender agreement – 6/48 (12.50%)
- data points with incorrect responses to grammaticality judgement questions (38.02% of remaining data)

Accuracy for grammaticality judgement questions

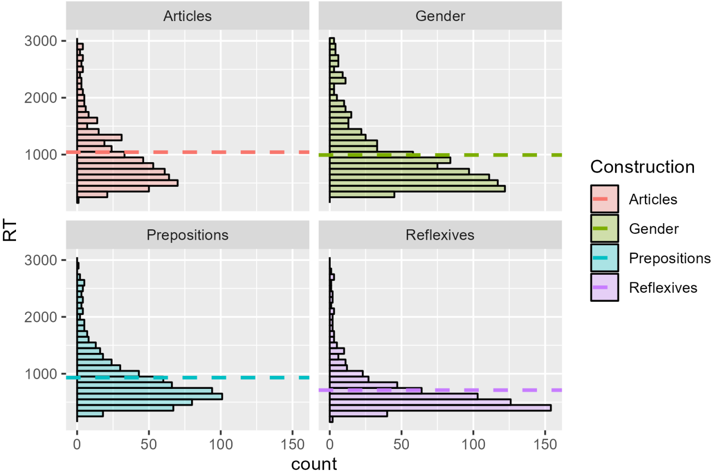


M = 61.98%
SD = 11.99%

Correlation between Norwegian proficiency and accuracy



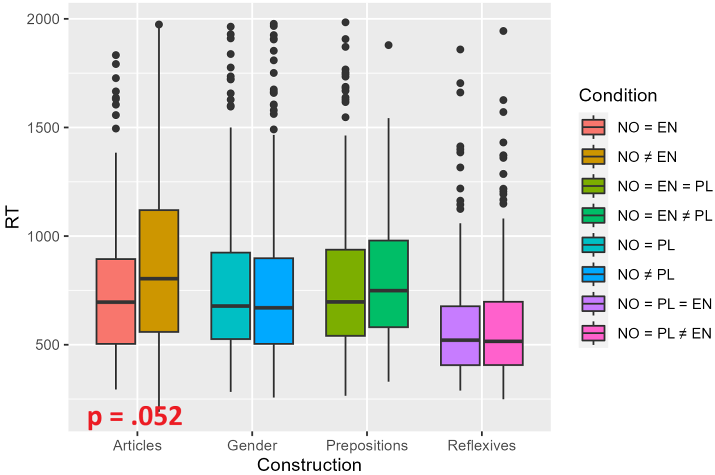
RTs per construction



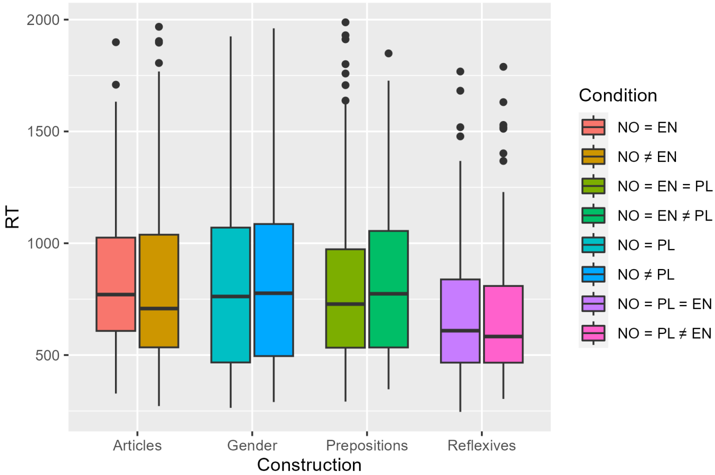
Data modelling

- linear mixed effects modelling in R: log_RT $\sim$ condition * grammaticality + (1|subject) + (1|sentence)
- **main effect of grammaticality**:
  - reflexive verbs (*p* < .001)
  - gender agreement (*p* < .001)
  - articles (*p* = .032)
- post-hoc analyses to test differences between cross-linguistically similar vs. different conditions for grammatical and ungrammatical sentences –
  no significant effects

RTs per construction for grammatical sentences



RTs per construction for ungrammatical sentences



1. General description
2. Previous studies
3. Constructions under investigation
4. Research questions and hypotheses
5. Methods
6. Results
7. Discussion

Discussion – hypotheses

H1: shorter RTs for grammatical than ungrammatical sentences ✓

confirmation of previous SPR data, esp. for articles (Ionin et al., 2019; Choo, 2020)

H2: shorter RTs in cross-linguistically similar than different conditions ✗

- linguistic similarity as only one of the factors influencing CLI (alongside complexity or salience) (Jensen et al., 2021)
- L1 effects more pronounced in L3 online processing, whereas L2 effects related to the metalinguistic knowledge (Lago et al., 2019)

Discussion – research questions

RQ1: Are Polish-English-Norwegian multilinguals sensitive to **grammatical violations in L3 Norwegian** in online and offline processing? – YES

- online processing – shorter RTs for grammatical than for ungrammatical sentences with accurate responses to AJ questions

RQ2: Is their performance influenced by **cross-linguistic similarities and differences** between L3 Norwegian and L1 Polish and/or L2 English? – NO

- no facilitation related to cross-linguistic similarities

Methodological considerations

- design complexity (construction x grammaticality x cross-linguistic similarity), making the results difficult to interpret
- problematic experimental items –> exclusions

Planned SPR study

- study design: non-cumulative self-paced reading
- participants: L1 Polish - L2 English - L3 Norwegian multilinguals
- reduced complexity (construction x grammaticality)
- modification of experimental stimuli
- separate self-paced reading and GJT tasks (i.e., online and offline)
- further suggestions?

UAM

Acknowledgements

- This research is supported by Norway funds/NCN project grant GRIEG-1 (UMO-2019/34/H/HS2/00495)
  ADIM “Across-domain investigations in multilingualism: Modeling L3 acquisition in diverse settings”
  PI: Magdalena Wrembel
- special thanks to Piotr Garbacz, Witosław Awedyk, and Marit Westergaard for consultations and feedback

Narodowe
Centrum
Nauki

Norway
grants

Thank you!

Alemán Bañón, J., Fiorentino, R., & Gabriele, A. (2018). Using event-related potentials to track morphosyntactic development in second language learners: The processing of number and gender agreement in Spanish. *PLOS ONE, 13*(7), e0200791.

Alexieva, P. D. (2012). Second language acquisition of reflexive verbs in Russian by L1 speakers of English. (unpublished PhD dissertation).

Choo, J. (2022) Online processing and offline judgments of L2-English articles. *Linguistic Approaches to Bilingualism, 12*,(3), 280–309.

Di Pisa, G., Kubota, M., Rothman, J., & Marinis, T. (2022). Effects of markedness in gender processing in Italian as a heritage language: A speed accuracy tradeoff. *Frontiers in Psychology, 13*.

Długosz, K. (2023). Cross-linguistic influence in the comprehension of reflexive possessive pronouns in L3 and L4 Swedish. *International Journal of Bilingualism, 0*,(0).

Dussias, P. E., & Piñar, P. (2010). Effects of reading span and plausibility in the reanalysis of wh-gaps by Chinese—English second language speakers. *Second Language Research, 26*(4), 443–472.

Gibson, M., Hufeisen, B., & Libben, G. (2001). Learners of German as an L3 and their production of German prepositional verbs. In J. Cenoz, B. Hufeisen, & U. Jessner (Ed.), *Cross-linguistic influence in third language acquisition: Psycholinguistic perspectives* (pp. 138–148). Multilingual Matters.

Ionin, T., Choi, S. H., & Liu, Q. (2021). Knowledge of indefinite articles in L2-English: Online vs. offline performance. *Second Language Research, 37*(1), 121–160.

Jackson, C. N., & Dussias, P. E. (2009) Cross-linguistic differences and their impact on L2 sentence processing. *Bilingualism: Language and Cognition, 12* (1), 65–82.

Jackson, C. N., & van Hell, J. G. (2011). The effects of L2 proficiency level on the processing of wh-questions among Dutch second language speakers of English. *IRAL, International review of applied linguistics in language teaching, 49*(3), 195–219.

Jensen, I. N., Mitrofanova, N., Anderssen, M., Rodina, Y., Slabakova, R. & Westergaard, M. (2023). Crosslinguistic influence in L3 acquisition across linguistic modules. *International Journal of Multilingualism, 20*(3), 717–734.

Keating, G., & Jegerski, J. (2015). Experimental designs in sentence processing research: A methodological review and user's guide. *Studies in Second Language Acquisition, 37*(1), 1–32.

Sokolova, M., & Slabakova, R. (2019) L3 sentence processing: Language-specific or phenomenon-sensitive? *Languages, 4*(3), 54.